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Scuola Internazionale Superiore di Stud, i Avanzati, Via Beirut, 2-4, I-34014 Trieste (IT).

(21) International Application Number:  
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(74) Agents: **CAPASSO, Olga et al.**; Desimone & Partners S.p.A., Via V. Bellini, 20, I-00198 Roma (IT).

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(71) Applicant (*for all designated States except US*): **S.I.S.S.A. SCUOLA INTERNAZIONALE SUPERIORE DI STUDI AVANZATI [IT/IT]**; Via Beirut, 2-4, I-34014 Trieste (IT).

(84) Designated States (*regional*): ARIPO patent (GH, GM, KE, LS, MW, MZ, SD, SL, SZ, TZ, UG, ZM, ZW), Eurasian patent (AM, AZ, BY, KG, KZ, MD, RU, TJ, TM), European patent (AT, BE, BG, CH, CY, CZ, DE, DK, EE, ES, FI, FR, GB, GR, HU, IE, IT, LU, MC, NL, PT, RO, SE, SI, SK, TR), OAPI patent (BF, BJ, CF, CG, CI, CM, GA, GN, GQ, GW, ML, MR, NE, SN, TD, TG).

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(75) Inventors/Applicants (*for US only*): **RUARO, Maria, Elisabetta [IT/IT]**; S.I.S.S.A. Scuola Internazionale Superiore di Stud, i Avanzati, Via Beirut, 2-4, I-34014 Trieste (IT). **BONIFAZI, Paolo [IT/IT]**; S.I.S.S.A. Scuola Internazionale Superiore di Stud, i Avanzati, Via Beirut, 2-4, I-34014 Trieste (IT). **TORRE, Vincent [IT/IT]**; S.I.S.S.A.

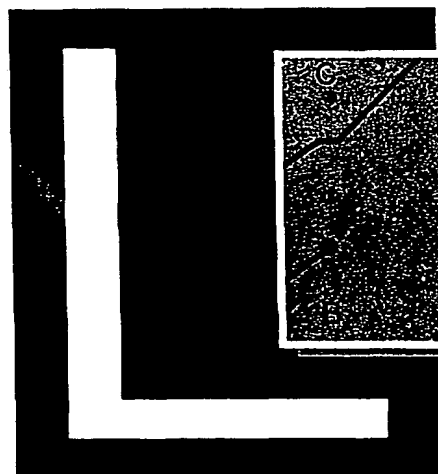
Published:

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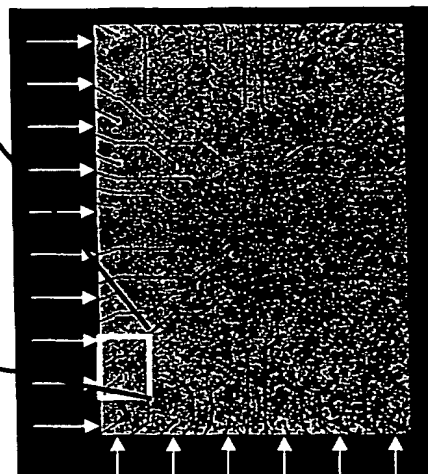
[Continued on next page]

(54) Title: **METHOD AND DEVICE FOR IMAGE PROCESSING AND LEARNING WITH NEURONAL CULTURES**

**A**



**B**



(57) Abstract: It is disclosed a device for image processing and learning comprising at least a "multi electrode array" (MEA), over which an homogeneous culture of interconnected neurons, so that forming a cell network, is grown on, wherein said MEA is able to stimulate and record the electric activity of said neurons. Methods for image processing and learning utilizing the device are disclosed too.

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According to International Patent Classification (IPC) or to both national classification and IPC

Minimum documentation searched (classification system followed by classification symbols)  
IPC 7 G06N

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched

Electronic data base consulted during the international search (name of data base and, where practical, search terms used)

EPO-Internal, WPI Data, PAJ

Category *	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
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X	<p>EGGERS M D ET AL: "ELECTRONICALLY WIRED          PETRI DISH: A MICROFABRICATED INTERFACE TO          THE BIOLOGICAL NEURONAL NETWORK"          JOURNAL OF VACUUM SCIENCE AND TECHNOLOGY:          PART B, AMERICAN INSTITUTE OF PHYSICS. NEW          YORK, US,          vol. 8, no. 6,          1 November 1990 (1990-11-01), pages          1392-1398, XP000169149          ISSN: 1071-1023          page 1392 - page 1398</p> <p style="text-align: center;">-----          -/--</p>	<p>1</p> <p>2,6</p>
A		

**X** Further documents are listed in the continuation of box C.

☒ Patent family members are listed in annex.

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- \*G\* document member of the same patent family

Date of the actual completion of the international search

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Authorized officer \_\_\_\_\_

**Jacobs, P**

# INTERNATIONAL SEARCH REPORT

International Application No

PCT/IT 03/00317

C.(Continuation) DOCUMENTS CONSIDERED TO BE RELEVANT		
Category *	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X	BUITENWEG J R ET AL: "FINITE ELEMENT MODELING OF THE NEURON-ELECTRODE CONTACT" November 2000 (2000-11), IEEE ENGINEERING IN MEDICINE AND BIOLOGY MAGAZINE, IEEE INC. NEW YORK, US, PAGE(S) 46-52 , XP000975448 ISSN: 0739-5175	1
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A	EP 1 104 911 A (UNIV CALIFORNIA) 6 June 2001 (2001-06-06)	

# INTERNATIONAL SEARCH REPORT

International Application No

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Patent document cited in search report		Publication date	Patent family member(s)		Publication date
EP 1104911	A	06-06-2001	EP	1104911 A2	06-06-2001
			EP	1104912 A2	06-06-2001
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			AT	208514 T	15-11-2001
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			DE	69429006 T2	18-07-2002
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			WO	9506288 A2	02-03-1995
			US	5717834 A	10-02-1998

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(IT). BONIFAZI, Paolo [IT/IT]; S.I.S.S.A. Scuola Inter-  
nazionale Superiore di Stud, i Avanzati, Via Beirut, 2-4,

I-34014 Trieste (IT). TORRE, Vincent [IT/IT]; S.I.S.S.A.  
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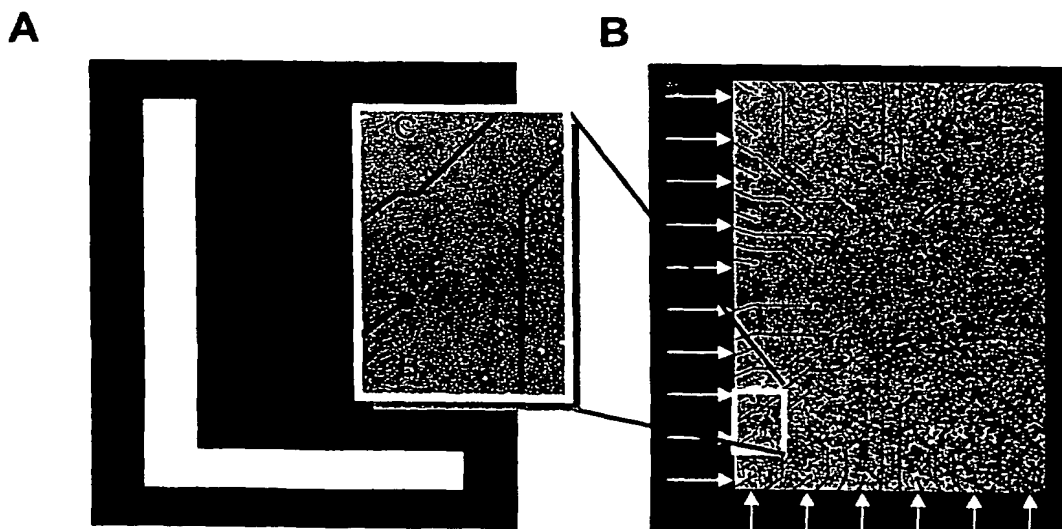
(81) Designated States (national): AE, AG, AL, AM, AT, AU,  
AZ, BA, BB, BG, BR, BY, BZ, CA, CH, CN, CO, CR, CU,  
CZ, DE, DK, DM, DZ, EC, EE, ES, FI, GB, GD, GE, GH,  
GM, HR, HU, ID, IL, IN, IS, JP, KE, KG, KP, KR, KZ, LC,  
LK, LR, LS, LT, LU, LV, MA, MD, MG, MK, MN, MW,  
MX, MZ, NI, NO, NZ, OM, PH, PL, PT, RO, RU, SC, SD,  
SE, SG, SK, SL, TJ, TM, TN, TR, TT, TZ, UA, UG, US,  
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Eurasian patent (AM, AZ, BY, KG, KZ, MD, RU, TJ, TM),  
European patent (AT, BE, BG, CH, CY, CZ, DE, DK, EE,  
ES, FI, FR, GB, GR, HU, IE, IT, LU, MC, NL, PT, RO,  
SE, SI, SK, TR), OAPI patent (BF, BJ, CF, CG, CI, CM,  
GA, GN, GQ, GW, ML, MR, NE, SN, TD, TG).

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[Continued on next page]

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